Introduction

Operational efficiency can be defined as the ratio between the input to run a business operation and the output gained from the business. When improving operational efficiency, the output to input ratio improves.

Inputs would typically be money (cost), people (headcount) or time/effort. Outputs would typically be money (revenue, margin, cash), new customers, customer loyalty, market differentiation, headcount productivity, innovation, quality, speed & agility, complexity or opportunities.

The terms "operational efficiency", "efficiency" and "productivity" are often used interchangeably. An explanation to the difference between efficiency and (total factor) productivity is found in "An Introduction to Efficiency and Productivity Analysis".[1] To complicate, "operational excellence" which is about continuous improvement - not limited to efficiency - is occasionally used when meaning operational efficiency. From time to time "operating efficiency" is also used with the same meaning as "operational efficiency".

Measuring Operational Efficiency

In order to improve operational efficiency, one has to start by measuring it. Since operational efficiency is about the output to input ratio, it should be measured both on the input and the output side. Quite often, company management is measuring primarily on the input side, e.g. the unit production cost or the man hours required to produce one unit. Even though important, input indicators like the unit production cost should not be seen as sole indicators of operational

efficiency. When measuring operational efficiency, a company should define, measure and track a number of performance indicators on both the input and output side. The exact definition of these performance indicators will vary from industry to industry, but typically these categories are covered:

- **Input**: Operational expenditure (OPEX), capital expenditure (CAPEX), headcount (including headcount of partners)
- **Output**: Revenue, customer numbers/distribution between segments, quality, growth, customer satisfaction

Comparing Operational Efficiency

If the intention is to compare numbers with others through benchmarking it is important to define, measure and track performance indicators for load and complexity as well. Even within the same industry, customer behaviour might e.g. be significantly different between two markets (or two countries) leading to one company having to assign more resources and cost to handling of customers. Not measuring such load and complexity factors might lead to incorrect conclusions on operational efficiency.

When interpreting the quantitative results of the benchmarking, it is important to consider the strategic differentiation:

"Cost is generated by performing activities, and cost advantage arises from performing particular activities more efficiently than competitors. Similarly, differentiation arises from both the choice of activities and how they are performed."

When qualitatively interpreting the quantitative results of the benchmarking, one has to take the company strategy into consideration - as well as the individual strategies of the other members of the peer group. If not done, quantitative results that are a consequence of strategy, not of inefficiency, can't be eliminated.

One company might have a strategy to differentiate with low price. For that company, it is critical to have low unit production costs and high efficiency in distribution. For another company, differentiating with premium quality, the unit production cost is not that critical (but still important to know, of course). Instead, it will be critical to have satisfied and loyal customers and a high absolute revenue per customer. Actual quality levels will also be key to understand.

Improving Operational Efficiency

For improving operational efficiency, companies have a few alternatives. The most common are:

- **Same for less**, i.e. same output for less input
- **More for same**, i.e. more output for same input
- **Much more for more**, i.e. much more output for more input

It is a common misconception that costs, in absolute terms, are always cut when improving operational efficiency. It is true for the "same for less" alternative, but not for the two other alternatives. It can be operationally efficient to increase cost - as long as the output is increasing more.

One example of a *same for less* alternative is when a manufacturing company reduces its total personnel (and thereby personnel cost) while still producing the same volume of goods. This can e.g. be achieved through centralisation, automation or optimisation of working processes.

An example of a *more for same* alternative is a manufacturing company reducing its output of faulty products (and thereby reducing after sales cost) without using more money or resources. This can e.g. be achieved through use of quality management systems, addressing quality in existing training programs for personnel or introduction of higher quality requirements when prolonging subcontractor agreements.

An example of a *much more for more* alternatives is when a manufacturing company invests in a new production plant which will enable them to produce products with a higher level of refinement than what could be produced in the old production plants. These products can be sold with a premium that more than compensates for the additional cost. Another example of "much more for more" is when a service company invests in expanding its customer service in order to increase customer satisfaction and customer loyalty.

Methods of Operational Efficiency

The analysis and interpretation of financial statements is an attempt to determine the meaning and significance of the financial data to check the performance in past, forecast for the future business performance and verifying the financial strength of the firm. In other words, financial analysis is the evaluation of a firm's past, present and anticipated future financial performance and financial condition. Its objectives are to identify the firm's financial strengths and weaknesses and to provide the essential foundation for financial decision making and planning. The broad methods of analysis are:

1. **Horizontal analysis:** This is the comparison, analysis and interpretation of a similar item of a financial statements relating to two different accounting periods.
2. **Vertical analysis:** This is comparison, analysis and interpretation of two items or variables of financial statements relating to the same accounting period.
3. **Static and dynamic analysis:** Static analysis measures the relationships among the items in a single set of statements. Dynamic analysis measures the changes in such items in successive statements. Static analysis is vertical analysis and dynamic analysis is horizontal analysis.
4. **Internal and external analysis:** The internal analysis is the analysis of financial data by the management of the enterprise itself for internal decision making. External analysis means the analysis of the data from the financial statements done by any

outsider like investors, banker, government revenue authority, any creditor, customers and others for taking a relevant decision.

Techniques of Operational Efficiency

Various techniques (also called tools) of financial analysis which have been frequently used and have become popular are:

1.Ratio analysis: A ratio is an arithmetical relationship between two figures. Financial ratio analysis is a study of ratios between various items or groups of items in financial statements. Ratios can be worked out to verify the profitability, liquidity, solvency, leverage, valuation and turnover of the firm.

2.Trend analysis, Common size statement analysis and comparative statement analysis: Trend analysis is concerned with dividing the magnitudes of significant items or groups of items in each of a series of statements by their magnitudes in one year in the series selected as base, thus obtaining a series of trend percentages or relatives to the base year. By studying the variations from base year, a comprehensive view of the business can be obtained.

Another variation is preparing common size financial statements, that is, common size income statement and common size balance sheet. For this, all items of the statement are compared with one common item, which is significant. For instance, in the income statement, sales may be taken as 100 and all other items in the statement are compared as percentage of sales. Similarly, in case of balance sheet the relation of each item to total assets/total liabilities is computed. Such common size statements or 100 % statements give useful proportions of each component of the total. The study of proportions and trend in the composition of proportions of various item and the meaning as well as

reasons of changes of proportions can be analyzed for relevant study. Trend analysis and common size statements will help in inter firm comparison.

3.Funds flow analysis: Funds flow analysis or the statement of sources and uses of funds shows the sources of funds and applications of funds during the period. Funds flow analysis provides insight into the movement of funds and helps in understanding the changes in the structure of assets, liabilities and owner's equity.

4.Cost - volume - profit analysis: Cost volume profit analysis is an important tool of profit planning. It analyses the interrelationships of changes in profit when the volume of output is changing and ultimately the variable cost and fixed costs are also changing. It is a tool which analyses profitability under various situations having different volume of activity. This profit planning tool is also called break even analysis. It helps the management in taking relevant decisions under different levels of manufacturing activity, different prices and ultimate effect of the behavior of fixed and variable costs which make up the total cost at different levels of business activity. It helps in quantifying and understanding the various components of costs under different situations and hence become a guide for future planning of business and profit.

5.Index Analysis: In index analysis, the items in comparative financial statements (income statement and the balance sheet) are expressed as an index relative to the base year. All items in the base year assume a value of 100. This type of analysis facilitates comparison of progress or down trend of activities over a period, since various years' figures/performance is compared with 100.

6.Leverage analysis: As a general concept, leverage represents influence of power. In financial analysis leverage represents the influence of one financial variable over some

other related financial variable. Financial leverage measures the effects in earning per share on account of changes in book profits. Operating leverage measures the effects in profit on account of changes in quantity produced and sold. Total leverage, that is, the combined effect of financial and operating leverage can also be analyzed. This will help in understanding the cost behavior and level of activity for profit planning and strategic decisions.

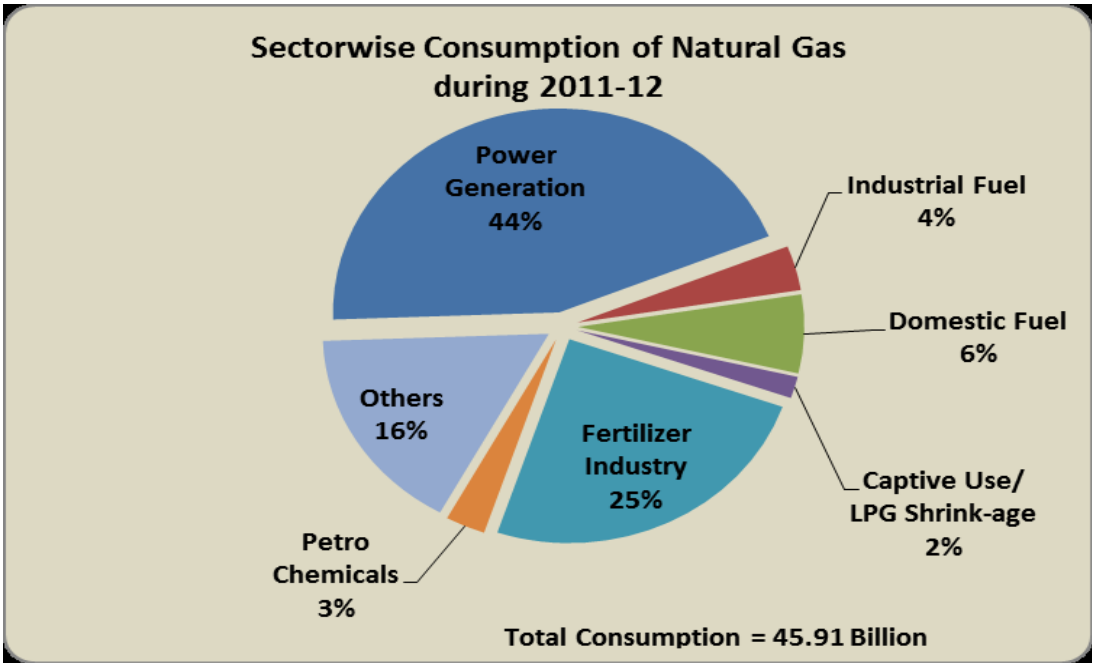
7.Balanced Scorecard: Now as a new development, most companies have a performance measurement system that includes financial measures as well as non financial measures. Financial measures are used primarily by senior management to monitor the performance of the firm as a whole. Non financial measures are employed mainly by operating managers to control short term operations. This integrated measurement framework is developed recently containing financial and non financial performance measures. The technique of Balance scorecard is strategy driven measure. In modern times, measurement focus of the scorecard is used to accomplish critical management processes. This tool of analysis focuses four important perspectives in a business, namely financial, customers, internal business and learning and growth. The technique of balanced scorecard links the objectives and measures thro cause and effect relationships existing in business. This way it is a comprehensive analytical tool of business activities measurement and performance appraisal.

Overview of Oil and Gas Sector in India

The Indian economy has experienced unprecedented economic growth over the last decade. Today, India is the ninth largest economy in the world, driven by a real GDP growth of 8.7% In the last 5 years (7.5% over the last 10 years). In 2010 itself, the real GDP growth of India was the 5th highest in the world. This high order of sustained economic growth is placing enormous demand on its energy resources. The demand and supply imbalance in energy is pervasive across all sources requiring serious efforts by Government of India to augment energy supplies as India faces possible severe energy supply constraints. A projection in the Twelfth Plan document of the Planning Commission indicates that total

Domestic energy production of 669.6 million tons of oil equivalent (MTOE) will be reached by 2016-17 and 844 MTOE by 2021-22. This will meet around 71 per cent and 69 per cent of Expected energy consumption, with the balance to be met from imports, projected to be about 267.8 MTOE by 2016-17 and 375.6 MTOE by 2021-22.

In 2011-12, India was the fourth largest consumer in the world of Crude Oil and Natural Gas, after the United States, China, and Russia. India's energy demand continued to raise inspite of slowing global economy. Petroleum demand in the transport sector is expected to grow rapidly in the coming years with rapid expansion of vehicle ownership. While India's Domestic energy resource base is substantial; the country relies on imports for a considerable amount of its energy use, particularly for Crude Petroleum.



Sector-wise Consumption of Natural Gas in India

HIGHLIGHTS IN THE PETROLEUM & NATURAL GAS SECTOR

Following are the main highlights of Petroleum & Natural Gas sector

- India has total reserves (proved & indicated) of 760 million metric tonnes of crude oil and 1330 billion cubic metres of natural gas as on 1.4.2012.
- The total number of exploratory and development wells and metreage drilled in onshore and offshore areas during 2011-12 was 756 and 1631 thousand metres respectively
- Crude oil production during 2011-12 at 38.09 million metric tonnes is 1.08% higher than 37.68 million metric tonnes produced during 2010-11.
- Gross Production of Natural Gas in the country at 47.56 billion cubic metres during 2011-12 is -8.92% lower than the production of 52.22 billion cubic metres during 2010-11
- The flaring of Natural Gas in 2011-12 at 2.26% of gross production is higher than a1.86% in 2010-11.
- The refining capacity in the country increased about 14% to 213.066 million metric tonnes per annum (MMTPA) as on 1.4.2012 from 187.386 MMTPA as on 1.4.2011.
- The total refinery crude throughput during 2011-12 at 211.42 million metric tons is higher about 2.63% than 206 million metric tonnes crude processed in 2010-11 (including RIL.SEZ Refinery)
- The production of petroleum products during 2011-12 was 196.707 million metric tonnes (excluding 2.213 million metric tonnes of LPG production from

natural gas against the last year's production at 190.316 million metric tonnes (excluding 2.168 million metric tonnes of LPG production from natural gas).

- The country exported 60.84 million metric tonnes of petroleum products against the imports of 15.00 million metric tones. During 2011-12 country imported 171.73. MMTcrude oil and 9.70 MMT LNG against 163.60 MMT and 8.95 MMT respectively during 2010-11.

The consumption of petroleum products during 2011-12 was 147.995 million metric tonnes (including sales through private imports) which is 4.93% higher than that of 141.040 million metric tonnes during 2010-11.

The total number of retail outlets of Public Sector Oil Marketing Companies as on1.4.2012 has gone upto 42138 from 38964 on 1.4.2011.

The total number of LPG consumers of Public Sector Oil Marketing Companies as on1.4.2012 were137.119 million against 125.388 million as on 1.4.2011.

History of Oil and Gas Sector

Petroleum is a naturally occurring liquid found in rock formations. It consists of a complex mixture of hydrocarbons of various molecular weights, plus other organic compounds. It is generally accepted that oil is formed mostly from the carbon rich remains of ancient plankton after exposure to heat and pressure in the Earth's crust over hundreds of millions of years. Over time, the decayed residue was covered by layers of mud and silt, sinking further down into the Earth's crust and preserved there between hot and pressured layers, gradually transforming into oil reserves.

The origin of the Indian oil and gas industry can be traced back to the late 19^{th} century when oil was first struck at Digboi in Assam in 1889.At independence, oil, exploration and production activities were largely confined to the North Eastern region particularly, Assam and the daily crude oil production averaged just 5,000 barrels per day. In the downstream sector the first refinery was setup in Digboi in1901.In the view of significance of oil and gas sector for overall economic growth, the Govt of India, under the industrial policy resolution of 1954, announced that petroleum would be the core sector the industry. In the pursuance of the industrial Policy Resolution 1954, petroleum exploration and production activates was controlled by the government town National Oil Companies (NOC) namely and Oil India Private Ltd (OIL).With the discovery of the Cambay Basin (in 1958e) and Bombay offshore basin (1974) , the domestic oil production increased considerably.

In 1997 Government announced New Exploration Licensing Policy(NELP) in 1997 as part of its Hydrocarbon Vision 2.Under NELP license for exploration are being awarded only through a competitive bidding process during these round.

Consequently to the various initiatives taken by the government currently the area under exploration being has increased fourfold. Prior to implementation of NELP 11% of India's sedimentary basin was under exploration. With the conclusion of seven rounds of NELP the area under exploration has increased to about 50% .One of the world's largest gas discoveries was made by Reliance Industries Ltd 2002in Jamnagar. Besides the entry of international companies like Hardy Oil &Gas, Santo, Niko Resources and Cairn Energy in India has helped boost the ground of the industry.

List of Top Ten Oil and Gas Companies of India

Followings are the main top 10 Oil and Gas companies in India:

1.Indian Oil Corporation Limited (IOCL)

2.Oil and Natural Gas Corporation Limited (ONGC)

3.Bharat Petroleum Corporation Limited

4.Reliance Petroleum Limited

5.Essar Oil

6.Gas Authority of India

7.Hindustan Petroleum Corporation Limited

8.Aban

9.Oil India Limited

10.Tata Petrodyne

Top 10 Oil and Gas Companies in India (ET-500)

As per ET-500 list the oil and gas sector has been one of the leading contributors to the national economy in 2011. The top 17 companies in the sector have together INR 1203096.49Cr and have earned an aggregate net profit of INR 399349.64Cr.

S.No	Company(ranking on ET 500 list Provided in bracket)	Revenue in 2011 (in Cr)	MCRPCR in 2011 (in Cr)
a.	Indian Oil Corporation Limited (1)	313627.88	73497.88
b.	Bharat Petroleum Corporation Limited (3)	155370.19	23681.44
c.	Hindustan Petroleum Corporation Limited (5)	140000.31	11934.77
d.	Oil and Natural Gas Corporation Limited(6)	124556.42	231052
e.	Essar Oil Limited (15)	48165	11430
f.	Manglore Refinery and Petrochemical limited (18)	39192.30	11115.17
g.	GAIL (India)Limited (22)	35664.08	53106.92
h.	Petronet LNG Limited (54)	13265.25	12026.25
i.	Cairn India Limited (72)	10406.72	54515.54

Company Profile

Oil and Natural Gas Corporation of India (ONGC)

Oil and Natural Gas Corporation of India (ONGC) is an Indian multinational oil and gas company and headquartered at Dehradun .It is India's largest oil and gas exploration and production company. ONGC has ranked 357th in ***Fortune Global 500*** list. It is India's largest oil and gas exploration and production company. It produces around 69% of India's crude oil (equivalent to around 30% of the country's total demand) and around 62% of its natural gas.

ONGC was found on 14th Aug 1956 by Govt of India which currently holds a 69.23% equity stakes. It is involved in exploiting hydrocarbon in 26 sedimentary basen of India and operates over 11,000 Km of pipelines in the country. ONGC has discovered 6 of the 7 commercially producing Indian Basin

Founded	:	1956
Type	:	Public
Headquarter	:	Dehradun
Chairman	:	Mr. Sudhir Vasudeva
Revenue	:	US$27.6billion
Employees	:	33000+

Indian Oil Corporation Limited

Indian Oil Corporation Limited is an Indian owned oil and gas corporation. It is world's 88th largest corporation according to ***Fortune Global 500*** list and the largest public corporation in India when ranked by revenue. Indian Oil and its subsidiaries account for a 49% share in petroleum product market , 31% share in refining capacity and 67% dowmstream sector pipelines capacity in India. Indian Oil began operation in 1959s Indian Oil Corporation was formed in 1964,with the merger of India Refinery Ltd. Recently India Oil Corporation has raised $ 500 million by selling 10year dollar denominated bonds .

Founded	:	1964
Type	:	Public
Headquarter	:	New Delhi
Chairman	:	Mr. R. S. Butola
Revenue	:	US$ 76.05billion
Employees	:	37000+

Bharat Petroleum Corporation Limited

Bharat Petroleum Corporation Limited is an Indian state controlled oil and gas company with headquarter in Mumbai, Maharashtra. BPCL has been ranked 229th in Fortune Global 500 list. 24th Jan 1976, The Burmah Group of Companies was taken over by the Government of India to form Bharat Refineries Ltd on 1st August it was renamed Bharat Petroleum Corporation Ltd. It was also first refinery to process newly founded indigenous crude in the country.

It is a refining, exploration and marketing PSU with Navrathan status. BPCL has changed its gears and embarked upon rapid growth path. Turnover grews by leaps and bounds .

Founded	:	1977
Type	:	Public
Headquarter	:	Mumbai
Chairman	:	Mr. S.Varadarujan
Revenue	:	US$ 76.05billion
Employees	:	15000+

Importance of Oil and Gas Sector

India is fast emerging as a major global market for petroleum products. The critical requirement for achieving higher growth rates is clearly the production and supply of sufficient amount of energy resources. However, not only will India continue to remain deficient in energy, but the gap between demand and domestic production is expected to grow considerably in the near future, crude oil expected to grow considerably is the near future, crude oil is particularly important in view of its crucial role in the transportation sector, especially for a large country like India, with a population of billion people and growing. Much of the investment in the upstream and downstream sectors is likely to flow through existing and new domestic and international companies.

Review of Literature

For the present following review of literature will be used:

Vipul C. Koradi (2013) states that the business firms are generally established with a view of earning profit from the business operation. Profitability is the main indicator for the efficiency and effectiveness of a business enterprises.

Ramani K. Vinod (2014) conducts a comparative appraisal of financial performance of Nationalised Banks, State Banks Group, Private Sector Banks and Foreign Banks in India During post reform era. The forgoing analysis reveals that though there is phenomenal development in quality, business per employee, capital adequacy and profitability. To improve the Financial Performance the public sector banks should reduce the operating cost, reduce NPA's ,develop quality asset and technology upgradation.

N Pusupati (2013) has analysed the relationship between Net Sales and Net Profit and determines the factors influencing the profitability of selected Oil Companies in India. The sample of 5 companies IOCL, EOL , HPCL CPCL and BPCL were taken. It was found that Net Sales and Net Profit were highly correlated and most influencing factor of profitability was Working Capital. Thus Companies must concentrate more on management of working capital.

Harsh Vineet (2013) reveals the management of efficiency and profitability through working capital.

Vijaykumar A (2013), states that productivity acts as a parameter to measure of the production to be granted to an industry to increase in the level of productivity reflects increase in effectiveness of input.

Sharma Asha (2012) states the Indian oil and gas sector has every significant forward linkage with the entire economy. Thus explains the importance of financial performance appraisal to increase the profitability.

Qasim Saleem, Ramez Ur Rehman (2011) reveals relationship between liquidity and profitability.Tthe study demonstrate that each ratio (variable) has a significant effect on the financial positions of enterprises with differing amounts and that along with the liquidity ratios in the first place. Profitability ratios also play an important role in the financial positions of enterprises. Every stakeholder has interest in the liquidity position of a company. Suppliers of goods will check the liquidity of the company before selling goods on credit. Employees should also be concerned about the company's liquidity to know whether the company can meet its employee related obligations–salary, pension, provident fund, etc. Thus, a company needs to maintain adequate liquidity so that liquidity greatly affects profits of which some portion that

will be divided to shareholders. Liquidity and profitability are closely related because one increases the other decreases.

Abdul Raheman, Dr. Talat Afza (2011) reviewed that the relationship between ratios and other tolls generally established that the performance /profitability of firm largely depends upon working capital management.

Brain Caver (2004) has made an attempt to study of historical aspect of oil and gas industry. They analyzed that oil and gas have historical formed an important component of India's export.

Objectives of the Study

Followings are the main objectives of the research:

1. To identify Operational Efficiency of the Petroleum Industry.
2. To determine Profitability Performance of Petroleum Industry.
3 .To analyze the Financial strength of Petroleum Industry.
4. To study the Liquidity Performance of Petroleum Industry.
5 To compare the overall Performance of Public sector Petroleum Sector in India.

Hypotheses of the study:

The study is based on the following hypotheses:

H0: There is no significant difference between Operational Efficiency of the Public sector oil and gas companies.

H1: There is significance difference between Operational Efficiency of Public sector oil and gas companies.

Methodology of Study

The study will be an explorative and descriptive research design. The data of sample companies will be collected from annual reports other data magazine, personal interviews with authorities... The study will be done with special reference to public limited companies and private limited companies. The reason is being that the data from financial statement are readily available. The technique of convenient sampling is being adapted for the study. For this, following tools will be used

Sample Design

The study is based on the public and private sector Oil and Gas companies in India. The selected companies are as follows:

1. Indian Oil Corporation Limited (IOCL)
2. Oil and Natural Gas Corporation Limited (ONGC)
3. Bharat Petroleum Corporation Limited (BPCL)

Parameters of the Research

1. Raw Material Cost
2. Work in Progress Cost
3. Finished Material Cost
4. Direct Expenses
5. Indirect Expenses
6. Indirect incomes

Data Collection

The study is mainly based on secondary:

- Annual reports
- Companies database
- Related websites
- Other related external and internal sources
- Journals
- Financial reports
- Personal Interviews

Period of Study

The study is mainly based for 10 years from 2003-04 to 2012-2013.

Limitations of the Study

Followings are the main limitations of the study:

1. The study is based on some specific tools and techniques.
2. The period of 10 years is taken for analysis.
3. The data is collected from secondary sources annual reports of the various oil and gas companies
4. The study is based on the operational efficiency.

CHAPTERISATION

1. Introduction of Operational Efficiency

1.1 Meaning of Operational Efficiency

1.2 Factors of Operational Efficiency

1.3 Objectives of Operational Efficiency

1.4 Techniques of Operational Efficiency

1.5 Scope of Operational Efficiency

1.6 The Present Study

1.7 Objectives of the Study

1.8 Hypothesis of the Study

1.9 Limitations of the Study

1.10 Scope of the Study

2. History and Development of Companies

2.1 History of Oil and Gas Sector in India

2.2 Role of Oil and Gas Sector in India

2.3 Company Profile

2.4 Public Sector Companies

3 .Operating Cost Efficiency Analysis

3.1 Meaning of Operating Expenses

3.2 Types of Operating Expenses

3.3 Role of Operating Expenses

3.4 Analysis of Operating Expenses

4. Operating Income Efficiency Analysis

4.1 Meaning of Operating Incomes

4.2 Types of Operating Incomes

4.3 Components of Operating Income

4.4 Analysis of Operating Incomes

5. **Profitability Efficiency analysis**

6.1 Meaning of Profit

6.2 Definition of Profit

6.3 Profit and Profitability Efficiency

5.4 Meaning of Profitability Efficiency

5.5 Importance of Profitability Efficiency

5.6 Tools of Profitability Efficiency

5.7 Analysis and Interpretation of Profitability Efficiency

5. Working Capital Analysis

6.1 Meaning and nature of Working Capital

6.2 Significance of Working Capital

6.3 Determinant of Working Capital

6.4 Types of Working Capital

6.5 Estimating Working Capital Requirement

6.6 Sources of Working Capital

6.7 Analysis and Interpretation of Working Capital

7.Findings and Suggestions

8.Bibliography

Bibliography

- Agarwal N K. , Cash Management in Indian Industries ,Vole 21, No1, pp 21-27
- Singh K.P Capital Structure and Returns, The Management Accountant, Vol- 16, No-8, pp 375-376
- Jain N.K. (2004), Working Capital Management, APH Publishing Corporation, New Delhi
- Khan M. Y. and Jain P.K. (1996), Financial Management, Tata McGraw Hill, Delhi, 1996
- Gupta S.P. (2000), Statistical Method, Sultan Chan &Sons, New Delhi
- Kothari C. R. (1990), Research Methodology Methods& Technique, New Age International Limited Publishers, Delhi
- Pandey I. M., Financial Management(2007), Vikas Publishing House Pvt Ltd
- Anand M. (2001), Working Capital Performance of Corporate India : An Empirical survey
- Barley J. Heineman,. 'Cost and management Accountancy for students', London Business India, Various Issues.
- Maheswari S.N, 'Management Accounting and Financial Control' Sultan Chand, New Delhi, 1987.
- Bhayani S .J. Practial Financial Statement Analysis, Raj Book Enterprise, Jaipur, 2004.
- Chowdhary S.B., Analysis of Company Financial Statement, Asia Publishing House, New Delhi, 1964

- Foulke A. Roy, Practical Financial Statement Analysis, Tata McGraw Hill, New Delhi, 1968.
- Narware P.C., 'Working Capital and Profitability an Empirical Analysis,' The Management Accountant, Calcutta, June 2004. | Poonia ,M.S., Analysis of Power and Fuel cost in Aluminum Companies in India, Indian Journal of Accounting, June – 2004

  Bhayan S.J., Practical Financial Statement Analysis, Raj Book Enterprise, Raipur, 2004.
- Chowdhary S.B., Analysis of Company Financial Statement, Asia Publishing

  House, New Delhi, 1964.
- Foulke A. Roy, Practical Financial Statement Analysis, Tata McGraw Hill, New Delhi, 1968. |
- Narware P.C., Working Capital and Profitability - An Empirical Analysis, The Management Accountant, Calcutta, June 2004
- M.S., Analysis of Power and Fuel cost in Aluminum Companies in India, Indian Journal of Accounting, June – 2004.
- Aramane, Petrol Ministry Reshuffles Portfolios of Senior Babus, , The Economics Times, Feb. 9, 2012.
- Arvind Kumar 'India's Oil Diplomacy" India's Oil Diplomacy'An International Journal of Ideas "THIRD CONCEPT" Vol.25, No.296, (October-2011).
- Ashwini Phafnid, Barter option open in India for Iran crude oil imports, Business Line, Jan.24, 2012.
- Chandrashekar G. Gold Silver Surrender gains, Crude Oil Prices Rising, Business Line, Feb. |13, 2012 |

- Mahalingam N “Beware of Petroleum Bubble” ,Kissan World Vol.8, No.7, (July 2011). |
- Prince R.C “Bioremediation of marine oil spills” Revue De L’ Institute Francais Du Petrol, Vol.58, No.4, pp.463-468 (2003).
- Srivastava “Decline in Oil& Gas Production Likely: Revival Not Before 2014” Monthly Public Opinion Surveys (7) Vol.LV11, No. 1 October, 2011.